

NEW GENERA AND SPECIES OF MELANOPLI FOUND  
WITHIN THE UNITED STATES (ORTHOPTERA;  
ACRIDIDAE)

BY MORGAN HEBARD

Part II

This is the second of a series of papers on undescribed Melanopli found in the United States. It was originally intended to include in the first paper, published in June, 1918,<sup>1</sup> all of the new forms found in the Philadelphia Collections, except those of the genus *Melanoplus*, but active duty in the Army prevented completion of the work to that point. Two new genera, ten new species and one new geographic race were there described. In the present paper twelve new species and one new geographic race are described, carrying this work through the first group of the genus *Melanoplus* with two eastern species in addition.

As in the first paper, the sequence of species described is in accordance with the revised arrangement of the species, from the preliminary studies already completed for the North American Melanopli.<sup>2</sup> Scudder's grouping of many of the forms has been found incorrect, and, particularly in the genus *Melanoplus*, his "Series" are in so many cases composed of widely separated species, that we have been obliged to institute a very different arrangement and have decided to rearrange the species into units which we have given "Group" designation. It should, therefore, be borne in mind that our Groups do not in any way correspond to Scudder's "Series."

<sup>1</sup>Trans. Am. Ent. Soc., xlv, pp. 141 to 169.

<sup>2</sup>We would note that our monotypic genus *Argiacris*, described in our first paper, comes between *Asemoplus* and *Bradynotes*. This genus was there described, in order to be able to make known one of the most distinctive units found among the undescribed forms at hand. One of our statements concerning this genus is, in part, incorrect. It is not distinguished from *Podisma* by the produced caudal margin of the pronotum, for in *Podisma*, as in *Melanoplus*, some of the groups are comprised of species which have the caudal margin of the pronotum angulate produced, while others have it weakly emarginate to different degrees.

A detailed discussion of the problems found in the genus *Melanoplus* will be given at a later date. For the present we would remark only one vital error in Scudder's treatment. That author's efforts were concentrated in an attempt to find some valid character to separate *Melanoplus* from *Podisma*. He determined the fact that the typical species of *Melanoplus* had a narrow mesosternal and metasternal interspace, while in typical species of *Podisma* these intervals were wider. Further study showed that this was not universal, but he considered it the most satisfactory feature for the generic assignment of species, and separated *Melanoplus* from *Podisma* thereby in his key.

After careful study of the situation, we have found that the width of the mesosternal and metasternal interspaces is subject to such individual variation that it is frequently of no diagnostic value, even for specific separation. In addition, we note that the forms of the Melanopli developed in a temperate environment have in the great majority of cases the mesosternal and metasternal interspaces narrow, while those developed in an arctic or arctic alpine environment have these interspaces usually broad. As a result, we find that arctic or arctic alpine species of *Melanoplus* have the mesosternal and metasternal interspaces fully as broad as in the species of *Podisma*, the majority of the species of which genus are found in arctic or arctic alpine regions. We are unable to find a single diagnostic feature to separate these genera. That *Melanoplus* and *Podisma* represent two distinct units is clear. In each case the genus divides into numerous sections, many of which are readily separable from the others by distinctive features. In fact we again find a situation much resembling that which occurs in the Tettigoniid genera *Conocephalus* and *Orchelimum*, and of which Rehn and Hebard have said, "Material of the two genera is easily separated by a decidedly different general appearance, but when the characters of the two are compared, the variation in each genus leaves us unable to state a single absolute difference."

As a result of Scudder's misconception of the significance of the widening of the mesosternal and metasternal interspaces, that author assigned to *Podisma* the following species, all of which are clearly members of the genus *Melanoplus*: *nubicola* Scudder, *stupefacta* Scudder, *dodgei* (Thomas), *ascensor* Scudder,

*marshallii* (Thomas), *oregonensis* (Thomas) and *frigida* (Boheman). Puschnig has more recently described still another European species of *Melanoplus* as a *Podisma*, this being *prossenii* from the Eisenhut in Carinthia.

We would remark that, as a result of the above assignments, all of the North American species remaining in the genus *Podisma* have the caudal margin of the pronotum concave and entirely lack organs of flight. To the genotype of *Podisma*, which is *pedestris* (Linnaeus), three North American species of *Asemoplus*, *hispidus* (Bruner), *somesi* here described and *rainierensis* Caudell, show a strong general similarity, but, in our opinion, represent a section of another valid unit. This unit, however, is almost as difficult to define as those discussed above.

In the preparation of the present paper we have met with most kind and hearty cooperation from many of our fellow workers. We are particularly indebted to Dr. E. M. Walker of the University of Toronto, Mr. Wm. T. Davis of New York and Mr. M. P. Somes, now of Kalispell, Montana. These gentlemen have furnished material which has increased the number of undescribed forms studied and has assisted in important comparative studies.

It must also be remembered that very large series are now assembled for a study of the North American Melanopli, and that these have proved invaluable in preparing the present series of preliminary papers. Without the opportunity to study these series, we would not be able to handle the problems involved with anything like the assurance we now consider ourselves justified in feeling. For the opportunity to study very important sections of these series we are deeply indebted to Mr. James A. G. Rehn of the Academy of Natural Sciences of Philadelphia, Dr. Samuel Henshaw of the Museum of Comparative Zoology and Mr. A. N. Caudell of the United States National Museum. In the present paper one thousand and forty-three specimens are recorded, one thousand and eleven of these belonging to the Philadelphia Collections.

**Hesperotettix pacificus capillatus**<sup>3</sup> new geographic race (Plate XXIX, fig. 1.)

1897. *Hesperotettix pacificus* Scudder, Proc. U. S. Nat. Mus., xx, p. 61. (In part.) [♀; San Buenaventura, California.]<sup>4</sup>

The present geographic race and *pacificus pacificus* Scudder, both show considerable size, tegminal and color variation. Considering the fact that, as is usual in the present genus, the male genitalia show no differential characters, the characterization of these races is difficult. The series at hand, however, offer such convincing proof that separation must be made, that we feel no hesitancy in describing the present race.

This race is clearly a depauperate condition of the species and will probably be found locally distributed along the Californian coast, from Monterey Bay southward to the Santa Barbara Channel. The size averages smaller, the surface is not as smooth and the hairy covering is generally more pronounced, the antennae average distinctly shorter and the caudal femora are slightly less enlarged proximad, than in *pacificus pacificus*.

Both races develop a green, pale brown and dark brown color form. In the green condition of the present race no broad reddish annuli of the cephalic and median femora and broad pregenicular reddish annulus of the caudal femora are found, which markings are usually met with in this phase of typical *pacificus*, and *pacificus capillatus*, further, is normally much less brilliantly colored. In both green and brown phases this race usually has the characteristic buffy markings less conspicuous and reduced to a greater extent than is usual in *pacificus pacificus*.

*Type*.—♂; Del Monte, Monterey County, California. September 9 and 10, 1910. (Rehn and Hebard.) [Hebard Collection, Type no. 484.]

Size small for the genus, form slender, surface well supplied with minute pilose hairs, more thickly than is normal in *pacificus pacificus*. Eyes appreciably deeper than infra-ocular portion of the genae. Sulcation of the fastigium and frontal costa moderately decided, slightly more pronounced than in *pacificus pacificus*. Antennae short and stout for the genus, little longer than combined length of head and pronotum, shorter and stouter than in *pacificus*

<sup>3</sup> In allusion to the normally more hairy condition found in this race, when compared with the typical race of the species.

<sup>4</sup> An additional female from Scudder's series, in the Hebard Collection, labelled in pencil "Los Angeles, Cal. 1888," is referable to the present race. In this case, we believe the labelling to be incorrect, or inaccurate.

*pacificus*. Caudal margin of disk of pronotum obtuse-angulate produced, with immediate angle rather sharply rounded. Tegmina small elongate-oval pads, costal margin curving distad more sharply than sutural margin, forming an acute point directed dorso-caudad.<sup>5</sup> Genitalia showing no features of difference from *pacificus pacificus*. Caudal femora moderately enlarging proximad, appreciably less robust there than in *pacificus pacificus*.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Differs from the type in the following features. Size larger, form moderately stout for the genus. Sulcation of the fastigium and frontal costa weaker and broader. Antennae even shorter, distinctly shorter than the combined length of the head and pronotum, distinctly shorter and stouter than in this sex of *pacificus pacificus*. Caudal margin of pronotum forming a more obtuse angulation. Genitalia as in this sex of *pacificus pacificus*.

*Measurements (in millimeters) of extremes only*

	Length of body	Length of antenna	Length of pronotum	Length of tegmen	Width of tegmen	Length of caudal femur
♂						
Type . . . . .	15.3	6.4	4.1	2.9	1.8	9.4
Paratypes (53)	13.5-16.5	5.8-6.8	3.5-4	2.5-3.2	1.2-1.7	8.2-9.5
♀						
<i>Allotype</i> . . . . .	19.8	5.7	5	3.7	2	10.7
<i>Paratypes</i> (16)	18-20.3	5.2-5.7	4.4-5	2.7-3.9	1.7-2	10-10.8

The female from San Buenaventura shows divergence toward *pacificus pacificus* only in having the caudal femora slightly heavier than is normal in the present race.

A single male of *pacificus pacificus* from Marcell, Kern County, California, shows some divergence toward the present race in the somewhat narrower tegmina and caudal femora, but in all other respects is typical.

*Coloration*.—Dark brown, lighter brown and yellowish green phases of coloration are found in *pacificus capillatus*. All of the males are brown and only a few show some recession in coloration; eleven of the nineteen females are brown, of the same shade as the paler males. In this phase the narrow buffy medio-longitudinal dorsal line and narrow bar or bars<sup>6</sup> of the postocular portion of the genae and prozonal portion of the lateral lobes of the pronotum are distinct but not conspicuous. The external faces of the caudal femora are suffused proximad, mesad and in the pre-genicular area with dark brown, this sometimes greatly reduced, but in the majority distinct, the median and distal suffusions running across the dorsal surface as broad and distinct transverse bands.

<sup>5</sup> This feature varies individually in degree, but the entire series shows smaller and narrower tegmina, with apices less evenly rounded, than is shown in the considerable series of *pacificus pacificus* at hand.

<sup>6</sup> This is an individually variable feature. In the majority of specimens a narrow bar of buff is found below the broad dark bar of the prozonal portion of the lateral lobes of the pronotum. In others a trace of buff is shown also above the dark bar, and in some this is developed into a second bar of buff, as wide as or even wider than the ventral buff bar.

In the females the medio-longitudinal buffy line is broader, and in yellowish-green individuals is often conspicuously margined with brown, which is most decided on the abdomen. In this phase the buffy lateral markings are sometimes greatly reduced or wholly obsolete, as is also the dark band of the prozonal portion of the lateral lobes. In the paler brown examples the caudal femora have the darker suffusions reduced, the dorsal surface unicolorous; in the yellowish green individuals these suffusions usually disappear, rarely being weakly indicated, the dorsal surface washed with pale brown. No trace of pink pre-genicular annuli is found in the present series.

The slightly rougher surface and more numerous hairs of the majority of examples of the present race, gives the series less of the smooth and shining facies of the series of *pacificus pacificus* at hand.

*Specimens Examined:* 74; 54 males and 20 females.

CALIFORNIA: Del Monte and San Buenaventura.

With one exception, these specimens were taken at Del Monte by Hebard on August 20, 1909, and by Rehn and Hebard on September 9 and 10, 1910, and, excluding the type and allotype, are designated as paratypes. The female, recorded by Scudder from San Buenaventura, belongs to the United States National Museum.

At Del Monte this insect was found scarce on the shore side of the sand dunes, in low scattered grasses and bushes, where a low yellow-flowered "tar-weed" was conspicuous. In this situation more individuals were met with than elsewhere, particularly in the sand-loving Composite bush, *Chrysoma ericoides* (Less.). This race was also present, but scarce, in extensive open areas of short dry grass, where also much of the low yellow-flowered "tar-weed" was found. Orthoptera was present in great numbers in these areas, much the most abundant species being *Melanoplus microtatus*, here described, while *Melanoplus devastator* Scudder was very numerous and the species here described as *Oedaleonotus phryneicus* and *fratercula* were frequently encountered.

#### AEOLOPLUS Scudder

1897. *Acoloplus* Scudder, Proc. Am. Acad. Arts and Sciences, xxxii, p. 199.

1897. *Acoloplus* Scudder, Proc. U. S. Nat. Mus., xx, p. 68.

1916. *Acoloplides* Caudell, Proc. U. S. Nat. Mus., xlix, p. 28.

The above synonymy is the result of Caudell's misinterpretation of the original type designation. The type of the genus is not "*Caloptenus regalis* by original designation," as stated by that author. Scudder gives *Acoloplus regalis* as type, without

further citation of author. This species is *Aeoloplus regalis* of Scudder and not *Caloptenus regalis* of Dodge. Scudder had a species of *Aeoloplus*, which he described and referred to *regalis* of Dodge, but with uncertainty, as his comments on page 73 show. Had Scudder given *Aeoloplus regalis* Dodge as genotype, Caudell's action would have been correct; but it is the species described by Scudder, not Dodge's species, which Scudder designated as genotype. It has been ascertained that *Caloptenus regalis* Dodge is a member of the genus *Melanoplus*; *Aeoloplus regalis* Scudder has been correctly renamed by Caudell,<sup>7</sup> and now stands as *Aeoloplus bruneri* Caudell, type of the genus *Aeoloplus*.

***Aeoloplus eremiaphila***<sup>8</sup> new species (Plate XXIX, figs. 2 and 3.)

The present species is the smallest known representative of the genus. The tegmina vary from ovate, but attingent, to a half fully-developed condition. The caudal femora do not have the margin of the ventral surface produced proximad in a shielding plate. In position we would place this insect after *A. chenopodii* (Bruner) and before *A. turnbulli* (Thomas), to the latter of which species it shows nearest relationship.

Comparing series including the types of *chenopodii* and *eremiaphila*, the former species is found to be larger and slightly heavier in structure, with vertex slightly broader, eye not as large in relative proportion, in length only slightly exceeding the genae, caudal margin of pronotum much more truncate, tegmina ovate and lateral, never attingent, subapical tubercle of male subgenital plate less acute, and coloration and color pattern distinctive.

Compared with a series of the more closely related *turnbulli*, that species is found to differ in its larger size, slightly more produced vertex, distinctly smaller eye in relative proportion, which in length is about equal to or slightly less than that of the genae, less definitely atrophied tegmina and wings even in the condition of maximum reduction, presence of a green as well as a brown color phase and coloration and color pattern distinctive.

*Type*.—♂; Foothills of Singatse Range at Mason, Lyon County, Nevada. Elevation, 4600 feet. September 6, 1910. (Rehn and Hebard.) [Hebard Collection, Type no. 485.]

Size very small for the genus; form moderately robust, medium for the genus. Fastigium of vertex very blunt, very slightly produced; eyes prominent, in

<sup>7</sup> Proc. Ent. Soc. Wash., viii, p. 134, (1907).

<sup>8</sup> From *ἐρημία* and *φιλην*, a lover of the desert.

length considerably greater than the genae. Pronotum with transverse sulci apparent but not pronounced, those cephalad feeble; medio-longitudinal carina of metazona distinct; caudal margin obtuse-angulate produced with apex rounded. Tegmina small, sub-ovate, attingent pads, about as long as pronotum,<sup>9</sup> with apices rather sharply rounded. Cerci simple, moderately broad and compressed at base, tapering slightly and evenly in proximal half, the distal half very slender, nearly subequal in width to the rounded apex. Sub-apical tubercle of subgenital plate decided, its apex as slender and sharply rounded as the cercal apices. Cephalic and median femora almost straight and moderately heavy, not as much bowed or as heavy as in this sex of the majority of the species of *Aeoloplus*.<sup>10</sup> Median tibiae scarcely at all curved. Caudal femora without margin of ventral surface produced proximad in a shielding plate.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Agrees with the type in ambisexual features, differing in the following respects. Size slightly larger,<sup>11</sup> form appreciably heavier. Fastigium of vertex broader. Ovipositor valves with apices moderately elongate and gently curved. Cephalic and median femora longer and more slender. Median tibiae straight.

*Measurements (in millimeters)*

	♂	Length of body	Length of pronotum	Length of tegmen	Width of tegmen	Length of caudal femur
Singatsé Range, Mason, Nevada, <i>type</i> . . . . .		12	3	2.9	1.9	6.9
Singatsé Range, Mason, Nevada, <i>paratype</i> . . . . .		12.1	3	3.6	2	6.8
Singatsé Range, Mason, Nevada, <i>paratype</i> . . . . .		12.4	3.3	4.7	2.1	7
	♀					
Singatsé Range, Mason, Nevada, <i>allotype</i> . . . . .		14.3	3.3	3.2	2	7.7
Singatsé Range, Mason, Nevada, <i>paratype</i> . . . . .		15.1	3.6	3.3	2	7.8
Mina, Nevada . . . . .		16.5	3.7	5.8	2.1	8
Mina, Nevada . . . . .		15.5	3.4	6	2.2	8
Mina, Nevada . . . . .		16.3	3.9	6.2	2.3	8.6
Pilot Mountains, Nevada . . .		15	3.6	5.9	2.2	8
Pilot Mountains, Nevada . . .		16.2	3.5	5.6	2	8
Pilot Mountains, Nevada . . .		16.5	3.8	5.9	2.2	8.1

<sup>9</sup> The tegmina vary in the present species from this type to a half fully-developed condition. Though clearly largely individual, geographic distribution may prove to have some effect on this feature. See table of measurements.

<sup>10</sup> Examination of the material at hand shows these to be secondary sexual features, as is the curvature of the median tibiae, differing in degree of development in the male sex of different species of the genus.

<sup>11</sup> The majority of females at hand are distinctly larger than the type.

In the examples having the longest tegmina, these organs are decidedly attenuate in their distal two-fifths, due to the fact that the costal and sutural margins show a very strong convergence in the third fifth of the tegmen.

In the condition of maximum tegminal reduction, the wings are minute and greatly atrophied. From this condition, they develop to fully as long as the tegmina in the condition of maximum tegminal development.

*Coloration.—Type.* Head cinnamon-buff, microscopically flecked with blackish brown; this increasing on the vertex and occiput, there forming an inconspicuous longitudinal band. Eyes clay color, microscopically marked with a network of blackish brown. Antennae pinkish cinnamon. Pronotum and tegmina sayal brown, with microscopic flecks and longitudinal streaks of bister; prozona showing an indistinct medio-longitudinal band of blackish brown, but with median carina sayal brown; lateral lobes with a longitudinal blackish suffusion dorsad before the principal sulcus. Cephalic limbs and underparts cinnamon-buff; median limbs of the same coloration but flecked with blackish brown. Caudal femora cinnamon-buff, with the three dark areas, characteristic of the species of the genus, heavy and blackish brown. Abdomen cinnamon-buff with proximal segments blackish brown proximad.

Little color variation is shown by the present series. A few individuals are somewhat recessive in coloration and in these the general coloration is clay color, with all darker markings reduced, the pronotal markings and those of the caudal femora weak and poorly defined. One such example from the Pilot Mountains has the caudal femoral markings obsolete.

*Specimens Examined:* 11; 3 males and 8 females.

NEVADA: Foothills of Singatse Range at Mason, Mina and Pilot Mountains, three miles east of Mina.

The series examined, in addition to the type and allotype, are considered paratypes. All were taken by Rehn and Hebard.

The desert valley at Mina, 4800 to 5300 feet in elevation, with long and very gradual alluvial slopes running down into a large central playa, proved an area of scarce insect life. But, from the several species of dense and heavily thorned, leafless bushes on the slopes, three specimens of this species were secured after long and careful search. On the same day, three miles distant in the sterile and desert Pilot Mountains, three more specimens were taken. These were found in similar thorn bushes, scattered over the almost bare slopes at the foot of precipices and at the heads of cañons, at 5500 to 5700 feet. Great numbers of these bushes were examined, the only Orthoptera there found being the few specimens of the present species, *Ligurotettix coquillettei* McNeill in moderate numbers, and a single specimen of a Dectid which has as yet not been studied.

Two days later at Mason, in a generally similar area and from similar but heavier thorn bushes, five more individuals were

secured, at elevations from 4500 to 5200 feet in the foothills of the Singatse Range. The most successful method of capturing these specimens was to tramp down the brittle thorn bushes, in which case individuals of *Ligurotettix coquillettei* McNeill would fly swiftly to other adjacent bushes, but those of the present species would appear confused and could be taken by exercising reasonable caution. When this method was not followed, these little insects were found to slip about in the dense twigs and thorns with great agility and would occasionally disappear, leaving the pursuer baffled, with hands usually well scratched.

#### OEDALEONOTUS Scudder

1897. *Oedaleonotus* Scudder, Proc. Am. Acad. Arts and Sciences, xxxii, p. 203.

1897. *Oedaleonotus* Scudder, Proc. U. S. Nat. Mus., xx, p. 390.

After careful consideration we find that the present genus, in addition to the species referred to it by Scudder, properly includes all the species which that author assigned to the Borekii Series of the genus *Melanoplus*, with the exception of *Melanoplus scitulus* Scudder.

The genus *Oedaleonotus* will be fully discussed at a later date. This rearrangement is noted here only in order to explain the generic assignment of the following new species.

***Oedaleonotus phryneicus***<sup>12</sup> new species (Plate XXIX, figs. 5 and 6.)

1908. *Melanoplus tenuipennis* Caudell (not of Scudder, 1897), Proc. U. S. Nat. Mus., xxxiv, p. 78. [Guadalupe, California.]

Closely related to *O. tenuipennis* (Scudder), (see plate XXIX, fig. 7), which species differs from *phryneicus* in the average lighter build, particularly in the females, decidedly weaker and less irregular median and lateral carinae of the pronotum, less decidedly inflated prozona, less decided pronotal sulci and in particular the less decided channel of the first sulcus dorsad on the lateral lobes, where its termination occurs, less decided expansion of the pronotal disk caudad, this more decided in females, and less heavily pitted metazona and corresponding portion of the lateral lobes.

*Type*.—♂; Del Monte, Monterey County, California. August 20, 1909. (M. Hebard.) [Hebard Collection, Type no. 486.]

Size medium for the genus, form moderately robust. Head much as in *tenuipennis*. Pronotum with median and lateral carinae and sulci decided; lateral carinae feebly concave and feebly expanding on the prozona, more

<sup>12</sup> From *φρόνος* = a toad, and *εἰκός* = like. In allusion to the squat, rough appearance, particularly of females of the present species.

strongly expanding caudad on the metazona; channel of the first sulcus dorsad on the lateral lobes, where its termination occurs, brief but deep, margined caudad with a conspicuous fleck of pale coloration; prozona distinctly inflated; caudal margin of disk transverse, showing a feeble obtuse-angulate emargination mesad, the two halves thus formed feebly convex. Tegmina lateral oval pads,<sup>13</sup> distinctly shorter than the pronotum, well separated. Genitalia as in *tenuipennis*. Longitudinal marginal carinae of the caudal femora pronounced.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Similar to the male type except in the following features. Size decidedly larger, form very robust. All pronotal features intensified. The lateral carinae of the disk of the pronotum show microscopic pits, which give them an irregular roughened appearance; these carinae expand throughout their length, so that the caudal width of the pronotal disk is decidedly greater than the cephalic width, and very much more closely approximates the pronotal length than in this sex of *tenuipennis*. Tegmina<sup>14</sup> separated by a greater interspace. Ovipositor valves as in *tenuipennis*.

♂	Measurements (in millimeters)					
	Length of body	Length of pronotum	Cephalic width of pronotum	Caudal width of pronotum	Length of tegmen	Width of tegmen
Del Monte, California, type . . . . .	16.5	4.1	2	3.1	2.8	1.8
Del Monte, California, paratype . . . . .	15.5	3.9	1.9	3	3.2	1.8
Del Monte, California, paratype . . . . .	18.5	4.7	2.1	3.3	3.8	2
Del Monte, California, paratype . . . . .	19.2	4.9	2	3.2	3.2	2.1
Del Monte, California, paratype . . . . .	18	4.3	2	3.2	2.8	1.8
♀						
Del Monte, California, allotype . . . . .	22.8	5.8	2.7	5	3.4	2.5
Del Monte, California, paratype <sup>15</sup> . . . . .	19.5	4.9	2.5	3.8	2.6	2.2
Del Monte, California, paratype . . . . .	17.2	4.4	2.6	4.1	3.2	2
Del Monte, California, paratype . . . . .	16.2	4.3	2.2	4	2.7	1.8
Del Monte, California, paratype . . . . .	20	5.5	2.7	4.8	3.1	2.6
Del Monte, California, paratype . . . . .	22.9	6.2	2.8	5.1	4	2.6
Monterey, California . . . . .	23	5.5	3.1	5.2	4	2.7

<sup>13</sup> Varying in the males from elongate oval to (rarely) broad oval.

<sup>14</sup> More variable in relative size and form than in males.

<sup>15</sup> In this specimen the pronotal proportions are as found in *tenuipennis*, but the individual is typical of *phryneicus* in all other respects.

The measurements give the extremes of the series. The specimen doubtfully recorded as *tenuipennis* by Scudder, from Monterey County, California, is an aberrant example of that species, showing no approach toward the present insect.

We would note that in this species, as well as in *tenuipennis*, the degree of expansion of the pronotum caudad is individually variable. The amount of expansion, however, in the present species averages very distinctly greater. The swelling of the cephalic portion of the pronotum also shows some individual variation, but the present species always shows this feature to some extent, and with its rugged structure and more strongly defined carinae is decidedly distinctive in appearance.

*Coloration.*—*Type.* Head ochraceous-tawny becoming darker, cinnamon brown, on the occiput, with a still darker, broad post-ocular bar of mummy brown on each side. Pronotum with disk appreciably darker than lateral lobes, cinnamon brown, with lateral carinae ochraceous-buff washed with tawny; lateral lobes ochraceous-buff washed with tawny, this heavier caudad, except on dorsal half of prozona which, not including the cephalic margin, is mummy brown with a conspicuous dorso-mesal fleck of ochraceous-buff where the channel of the first sulcus terminates.<sup>16</sup> Tegmina and dorsal surface of abdomen cinnamon brown. Cephalic and median limbs internally pinkish buff, externally clay color with irregular flecks of blackish brown, these markings heaviest distad on cephalic femora and mesad on median femora. Caudal femora sayal brown; external face with a heavy proximal area of blackish brown, another mesad which is larger and very broadly V-shaped with apex mesocephalad, and another distad, the raised carinae bounding this face pale, clay color; dorsal surface sayal brown, its external half immaculate, the heavy median carina and internal half with three broad dark bands, which continue on the internal face, disappearing there mesad; ventral surface brilliant dragon's blood red, this color suffusing also the proximal portion of the internal face. Caudal tibiae deep bluish gray green, with a broad proximal annulus of cinnamon-buff; spines whitish, tipped with black. Ventral surface cinnamon-buff.

Only a moderate degree of intensification and recession is shown by the large series at hand, the general coloration ranging from bister, with paler portions sayal brown (intensive), to sayal brown, with paler portions clay color (recessive).

*Specimens Examined:* 187; 89 males, 97 females, 1 gynandromorph.<sup>17</sup>

CALIFORNIA: Del Monte, Monterey and Guadalupe.

<sup>16</sup> This fleck is a distinctive feature in the present species; with hardly any exceptions, being conspicuous in the large series before us. Hardly ever does this marking appear in *tenuipennis*, and when present is inconspicuous.

<sup>17</sup> This specimen is remarkable in having the entire sinistral portion from head to apex of abdomen male, the dextral portion female. As a result, due to the disparity of size in the sexes of this species, this specimen is asymmetrical throughout. This is the second gynandromorph examined by us, the first being a specimen of the Tettigoniid, *Insara elegans consuetipes* (Scudder) recorded by Rehn and Hebard, Trans. Am. Ent. Soc., xl, p. 81, (1914).

A single male at hand, from the National Museum, was taken on sugar beets at Guadalupe, Santa Barbara County, on June 24, 1906, by A. N. Caudell. Excepting two males and four females from Monterey, captured by G. P. Englehardt on August 4, 1916, the remaining series was taken at Del Monte by Hebard on August 20, 1909, and by Rehn and Hebard on September 9 and 10, 1910; excepting the type and allotype, these are considered paratypes. On both occasions the species was found common, particularly in the extensive open areas of short dry grass, where a low yellow-flowered "tar-weed" was abundant.<sup>18</sup>

**Oedaleonotus fratercula** new species (Plate XXIX, fig. 4)

This, the smallest species of the genus, is seen to be in some ways annectant between the other forms of the genus and the distinctive *O. fuscipes* (Scudder).

This insect agrees with *fuscipes* in general contour and appearance, and in the male sex in the absence of furcula and presence of an apical tubercle on the subgenital plate. It differs from that species in the smaller size, slightly less robust form, appreciable, though weak, lateral carinae of the pronotum and, in the male, in the supra-anal plate, which is unspecialized toward the cereal bases and the cerci, which are more slender distad.

*Type*.—♂; Del Monte, Monterey County, California. September 9 and 10, 1910. (Rehn and Hebard.) [Hebard Collection, Type no. 487.]

Size small, smallest of the genus; form medium, slender for the genus. Head very similar to that of *fuscipes*, eyes slightly longer than genae as in that species. Pronotum with lateral carinae weak; median carina well developed on metazona, moderately developed on proximal portion of prozona, subobsolete in intervening area; sulci moderately decided, the first the weakest; caudal margin of disk transverse, very feebly convex. Tegmina lateral, broadly oval pads, much shorter than pronotum, separated by a brief interspace.<sup>19</sup> Furcula absent. Supra-anal plate simple, elongate, triangular with margins gently convex and apex rounded, surface with a heavy and deep medio-longitudinal sulcation in proximal two-fifths, between the raised margins of this sulcation and the lateral margins it is broadly concave. Cerci proximad broad and moderately tumid, narrowing evenly in proximal three-fifths, distal two-fifths very narrow with apex rounded,<sup>20</sup> this portion curving moderately inward. Subgenital plate with a large and moderately blunt apical tubercle.

<sup>18</sup> See notes under *Hesperotettix pacificus capillatus* on page 262.

<sup>19</sup> The tegmina are occasionally attingent in this sex.

<sup>20</sup> The width of the distal portion of the cerci is seen to be variable to a certain degree in the males of *fratercula* at hand.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Similar to the male type except in the following features. Size decidedly larger; form robust, slenderest, however, for females of the species of *Oedaleonotus*. Pronotum similar, but with carinae and sulci all weaker. Tegmina very broad, sub-circular,<sup>21</sup> separated by a very slightly greater interspace. Ovipositor valves normal for the genus.

*Measurements (in millimeters) of extremes only*

	Length of body	Length of pronotum	Caudal width of pronotum	Length of tegmen	Width of tegmen	Length of caudal femur
♂						
<i>Type</i> . . . . .	11.5	2.8	1.8	1.9	1.7	7.8
<i>Paratypes</i> (64)	10.8-13.7	2.7-2.9	1.8-1.9	1.9-2.6	1.7-1.8	7.3-8
♀						
<i>Allotype</i> . . . . .	14.3	3.8	2.8	2.2	2	9
<i>Paratypes</i> (70)	13-14.8	3.1-4	2.3-3	1.8-2.3	1.6-2.1	8.2-9.8

Though the series shows little variation in contour and pronotal expansion, the females exhibit decided variation in relative size of the tegmina.

*Coloration*.—Uniform pale avellaneous on face, genae (except for a broad post-ocular bar of clove brown and a subocular patch of the same color), ventral half of the lateral lobes of the pronotum (except a hair line of clove brown running down the second sulcus and curving cephalad in the mesal portion of this area), cephalic and median limbs (which, however, are flecked and washed with dark brown, particularly on their external faces) and underparts. Antennae avellaneous with a decided cinnamon tinge. Eyes tawny olive. Vertex and occiput, disk of pronotum (which, however, is paler toward the lateral carinae) and tegmina, saccardos umber. Dorsal half of lateral lobes of pronotum to principal sulcus occupied by a large, longitudinally rectangulate area of shining clove brown, separated from the cephalic margin by a narrow band of pale avellaneous; lateral lobes caudad of principal sulcus heavily washed with saccardos umber. Dorsal surface of abdomen avellaneous washed with saccardos umber, all but the distal segments heavily suffused laterad with blackish brown, each of which markings is invaded by an area of avellaneous meso-caudad; latero-proximal angles of subgenital plate heavily washed and flecked with blackish brown. Caudal femora clay color, external and dorsal faces crossed by three heavy, zig-zag bands of blackish brown, the two more distal of which also cross the internal face. Caudal tibiae pinkish buff washed and speckled with clay color, proximal spines blackish brown, distal (majority) spines blackish brown, buffy proximad on their convex dorsal faces.<sup>22</sup>

A usual amount of color variation is shown in the series, the intensive extremes having the dark patch of the lateral lobes of the pronotum and bands of the caudal femora very heavy and conspicuous. A few females are very pale, one in particular being clay color fading to cinnamon-buff on the abdomen, caudal femora and tibiae, the femoral bands very weak, sayal brown, showing only on the dorsal surface.

<sup>21</sup> In this sex rarely broad-ovate.

<sup>22</sup> This varies in the series to a condition in which the entire proximal portion of the majority of these spines is buffy.

Another exceptional and striking variation, but one which is found to crop out in other species of the genus as well, is a condition in which the pronotum has a broad band of cinnamon-buff on each side dorsad on the lateral lobes along the lateral carinae of the disk, while the dorsal surfaces of the caudal femora are also cinnamon-buff except the genicular areas which are suffused with dark brown, only a trace of the dark bars remaining. Two males and eight females of the present series show this condition to varying degrees; it is very striking and as fully developed as described above in but three of these.

*Specimens Examined:* 136; 65 males and 71 females.

CALIFORNIA: Del Monte.

The entire series of this interesting little insect was taken by Hebard on August 20, 1909, and by Rehn and Hebard on September 9 and 10, 1910. The species was found plentiful in the flat, open, sandy country, where much low grass and a low yellow-flowered "tar-weed" was to be found. This species was also found moderately abundant on a yellow-flowered Composite bush, *Chrysonoma ericoides* (Less.), growing about sand dunes near the shore.<sup>23</sup>

**Asemoplus somesi**<sup>24</sup> new species (Plate XXIX, figs. 8 and 9.)

1904. *Podisma polita* Caudell (not of Scudder, 1899), Ent. News, xv, p. 63.

[♀; Kitchener Glacier on Mt. Kokanee, British Columbia.]

1907. *Asemoplus nudus* Caudell (not of E. M. Walker, 1898<sup>25</sup>), Proc. Ent. Soc. Washington, viii, p. 134. [♂, ♀; Paradise Valley, Mt. Rainier, Washington.]

1910. *Podisma nuda* E. M. Walker (in part not *Asemoplus nudus* of E. M. Walker, 1898), Can. Ent. xlii, p. 333. [♂, ♀; Banff, Alberta, Canada, and referring Caudell's record of *Podisma polita* to this species.]

<sup>23</sup> See notes under *Hesperotettix pacificus capillatus* on page 262.

<sup>24</sup> We take pleasure in naming this species for Mr. M. P. Somes, who has done excellent work in Orthoptera in Minnesota, Iowa and Missouri, and who has frequently furnished us with material of great importance in our studies.

<sup>25</sup> Examination of the entire series of paratypes and the description and figures of *Asemoplus nudus* E. M. Walker and comparison with the type and allotype of *Pezotettix hispidus* Bruner, shows that *nudus* is an absolute synonym of the latter species. We have further learned from Dr. Walker that his original determination was *hispidus*, but that he wrote Scudder, sending material and asking if the specimens were not *hispidus*, to which a reply was received congratulating him on the discovery of a new species and making no allusion to *hispidus* whatever. Thus we find another synonym attributable largely to the carelessness of Scudder. Dr. Walker, a most careful and excellent student, was in this case the victim.

We would note that Scudder removed *hispidus* from *Pezotettix* to his new genus *Bradynotes*. This is unwarranted, the species being in no way a derivative from the *Bradynotes* stock and is best assigned to the genus *Asemoplus* as at present understood.

In general appearance the present insect shows very close similarity to *A. hispidus* (Bruner); to these species *A. rainierensis* Caudell shows also close resemblance, though having small, elongate-ovate tegmina.

From both of the above species *somesi* differs in the male genitalia having relatively large furcula, which are longer than their basal width, the lateral portions of the supra-anal plate not thickened and raised in a separate small but distinct flange opposite the cerci<sup>26</sup> and the cerci elongate and heavy proximad, very slender and scarcely tapering in the distal two-fifths. In *hispidus* the cerci are approximately as long, but taper gradually to the slightly heavier apex; in *rainierensis* the cerci are much as in *hispidus*, but proportionately shorter and frequently slightly heavier.

Females of *rainierensis* are readily distinguished by the presence of tegmina; those of *somesi* and *hispidus* show but little of differential value, this sex of *somesi* being, however, slightly heavier, with pronotal proportions slightly broader.

The three species compared above are much closer to each other than to the genotype, *montanus*, that species being readily distinguished by the more evenly convex pronotum, different coloration and color pattern and form of the male cerci, which show distinct deflection distad. Tegmina are present in *montanus*, of much the same type as found in *rainierensis*.

In linear order we would place the species as follows; *montanus*, *somesi*, *hispidus* and *rainierensis*.

*Type*.—♂; Upper Little St. Mary Valley, above Lake Ellen Wilson, Glacier National Park, Montana. Elevation, 6700 feet. August 9, 1918. (M. P. Somes.) [Hebard Collection, Type no. 500.]

Size medium for genus, form rather stout and heavily built, surface well supplied with minute but moderately elongate pilose hairs. Head much as in *hispidus*, full; vertex moderately tumid, interspace between eyes one and one-quarter times as broad as first antennal joint, fastigium moderately depressed, frontal costa with margins feebly and broadly cingulate to below ocellus, nearly subequal in width throughout. Antennae shorter than caudal femora.<sup>27</sup>

<sup>26</sup> This feature is found to exhibit a certain amount of individual variation in some examples of *A. montanus* (Bruner), *hispidus* and *rainierensis*.

<sup>27</sup> We would note that in the series at hand of both *hispidus* and *rainierensis*, individuals from lower elevations have the antennae decidedly longer than those from higher levels.

Eyes rather small, about as long as infra-ocular sulcus. Pronotum rather short, scarcely broader caudad than cephalad, with a medio-longitudinal carina weakly defined on prozona, well defined on metazona and dorsal abdominal segments; transverse sulci decided; dorsum rounding into the lateral lobes but with angulation indicated, not rounding evenly as in *montanus*, prozona quadrate, caudal margin of pronotum truncate, very feebly obtuse-angulate emarginate. Latero-caudal angle of lateral lobes sharply rounded, slightly greater than a right-angle. Tegmina and wings absent. Prosternal spine acute conical and moderately slender from its broad base.<sup>28</sup> Interspace between metasternal lobes subquadrate.<sup>29</sup> Furcula represented by a pair of parallel<sup>30</sup> rounded projections, nearly one-fifth as long as supra-anal plate, decidedly larger than the maximum developed in either *hispidus* or *rainierensis*. Supra-anal plate elongate shield-shaped, with latero-caudal angles weakly indicated; median channel broad, percurrent, moderately deep in proximal portion; lateral portions rather strongly concave, the lateral margins raised and showing a slight thickening opposite the cerci, but no lamellae as in *hispidus* and *rainierensis*. Cerci distinctly over twice as long as proximal width, heavy proximad, tapering to distal two-thirds, which portion is slender, straight,<sup>31</sup> to the sharply rounded apex. Subgenital plate conical with margin toward apex scarcely elevated above lateral portions, apex notched and consequently binodose.<sup>32</sup> Cephalic and median femora moderately inflated and slightly bowed.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Very similar to this sex of *hispidus*, slightly heavier, with pronotum proportionately slightly broader. Larger and decidedly heavier than male, agreeing with that sex except in the following features. Eye about three-quarters as long as infra-ocular sulcus. Antennae distinctly shorter. Pronotum distinctly broader caudad than cephalad, with weak percurrent median carina cut by all the weak transverse sulci, caudal margin with obtuse-angulate emargination slightly stronger. Prosternal spine moderately blunt, conical from broad base.<sup>33</sup> Ovipositor valves as in *hispidus*. Cephalic and median femora not inflated, straight.

<sup>28</sup> See footnote 33.

<sup>29</sup> So great is the individual variation in the width of the interspace between the mesosternal and metasternal lobes in many species of the Melanopli that we have found these features of little or no value for diagnostic purposes.

<sup>30</sup> Divergent in one specimen from Banff, Alberta.

<sup>31</sup> In one specimen of the series showing a very feeble flexure ventrad.

<sup>32</sup> This varies in the present species, as in *hispidus*, to a condition in which this feature is obsolete. In *rainierensis* it is obsolete, though occasionally faintly indicated.

<sup>33</sup> In the paratypic series slightly less blunt than in the Canadian series of *hispidus* at hand, distinctly blunter than in the allotype of *hispidus* from Washington. The form of the prosternal spine, as of the mesosternal and metasternal lobes, has been found by us to be extremely variable in certain species of the Melanopli, and consequently unreliable for specific diagnostic use.

## Measurements (in millimeters) of extremes only

	♂	Length of body	Length of pronotum	Width of pronotum <sup>34</sup>	Length of caudal femur
Banff, Alberta (2) . . . . .		16.3-16.8	3.3-3.6	3.4-3.8	9.1-9.2
Upper St. Mary Valley, Glacier Nat. Park, <i>type</i> . . . . .		17	3.3	4	10.1
Upper St. Mary Valley, Glacier Nat. Park, <i>paratypes</i> (11) . . . . .		15 <sup>35</sup> -18.5	3.3-3.3	3.9-4	9.4-10.2
Mt. Rainier, Washington (7) . . . . .		14.8-17	3.1-3.4	3.6-3.9	9-9.7
	♀				
Lake Louise, British Columbia . . . . .		22	4	5	11
Mt. Kokanee, British Columbia . . . . .		18.5	3.7	4.8	10.9
Upper St. Mary Valley, Glacier Nat. Park, <i>allotype</i> . . . . .		20.5	4.1	5.2	12.1
Upper St. Mary Valley, Glacier Nat. Park, <i>paratypes</i> (18) . . . . .		19-23	3.9-4.1	5-5.2	11.2-12.3
Mt. Rainier, Washington (11) . . . . .		18.9-26 <sup>36</sup>	3.8-4	4.8-5	10.5-12.1

*Coloration*.—Male much as in *hispidus*; blackish olivaceous above, with a yellowish stripe on each side, interrupted at the first pronotal sulcus and sometimes at the intersections of the abdominal segments, running from the dorso-caudal portion of the eyes, along the dorsum of the pronotum just above the lateral lobes and along the abdomen to the last segments. The width and intensity of these bands shows some individual variation. Face and lower half of lateral lobes of pronotum yellowish. A blackish olivaceous band on each side starts from mesad on the caudal margin of the eye, occupies the dorsal half of the lateral lobes, expanding caudal on the metazonal portion, and is continued thence on the lateral portions of the abdomen, narrowing gradually distad. Underparts yellowish. Limbs reddish brown, the caudal femora showing three weakly defined, transverse suffusions of darker brown and a pregenicular pale area, which is weakly indicated on the caudal tibiae in the portion adjacent.

Female similar in general coloration, but much less brilliant. Reddish brown above, with paler bands represented only by a somewhat paler suffusion margining the dark lateral bands dorsad. Caudal limbs with markings even weaker.

*Specimens Examined*: 54; 20 males, 32 females and 2 immature females.

ALBERTA: Banff.

BRITISH COLUMBIA: Lake Louise and Kitchener Glacier on Mount Kokanee.

MONTANA: Upper Little St. Mary Valley above Lake Ellen Wilson, Glacier National Park.

IDAHO: Wallace.

WASHINGTON: Paradise Valley on Mt. Rainer.

<sup>34</sup> Including lateral lobes, which expand ventrad, particularly caudad.

<sup>35</sup> Specimen shrunken.

<sup>36</sup> Specimen abnormally distended.

In addition to the type and allotype, a series of eleven males, eighteen females and two immature females bearing the same data, are designated paratypes. The specimens from Banff were taken by Sanson [Walker Cln.], that from Lake Louise by Mrs. Schaeffer on July 5 [A. N. S. P.], that from Mount Kokanee by Caudell, at 9000 feet, on August 10, 1903 [U. S. N. M.], and the male from Wallace on August 5, 1917 [Davis Cln.].

The species was found at the type locality to be very numerous on coarse herbage among the rocks. It was not, however, generally distributed but occurred in isolated spots of similar ecologic conditions.

Caudell found the species with *rainierensis*, in about equal numbers, in the alpine herbage of Paradise Valley on Mt. Rainier, in July, 1906. The series taken is before us, from the National Museum and Walker Collections. It is of interest to note that though *rainierensis* was found there in great numbers by Rehn and Hebard on August 23 and 24, 1910, the present species was not met with at all.

**Bradynotes kaibab**<sup>37</sup> new species (Plate XXIX, fig. 12.)

The present species is closely related to *B. compacta* Morse (see plate XXIX, fig. 14), described from Ormsby County, Nevada, and to *B. pinguis* Scudder (see plate XXIX, fig. 11), the type of which is from "Reno,"<sup>38</sup> Nevada. Nearest relationship is with *pinguis*, the present insect differing in the smaller size, slightly broader form and in the male sex in the much more slender cerci. The more elongate pronotum with much more conspicuous and continuous lateral carina in *compacta*, readily distinguishes that species, in males of which the supra-anal plate is more nearly elongate triangular, the cerci much as in the present species.

The female sex closely resembles a diminutive condition of that sex of *pinguis*. The carinae of the fastigium are, however, distinct between the eyes, obsolete or subobsolete above the foveolae, a condition not found in any other species of the genus.

In the present series two males and four females have the caudal tibiae nopal red, in the other five females the proximal portions of the caudal tibiae are, to different degrees, deep bluish

<sup>37</sup> Named for the tribe of Paiute Indians who inhabited this region. The tribal name derived from kaiba = mountain.

<sup>38</sup> Probably from a high elevation in the mountains near Reno.

gray-green. This shows that the color of the caudal tibiae is of no diagnostic significance, at least in one sex of the present species.

*Type*.—♂; Duck Lake, Cedar Mountains, Iron County, Utah. Elevation, 9000 feet. July 14, 1917. (G. P. Englehardt.) [Hebard Collection, Type no. 501.]

Size small for the genus, not as small as in *B. excelsa* Rehn; form heavy, as in *pinguis*; surface very feebly pilose. Head broad and full, vertex gently tumid; fastigium shallowly concave, the lateral margins moderately prominent, rounded; frontal costa much as in *pinguis*, but very slightly narrower and moderately punctate, least width slightly greater than width of proximal antennal joint, shallowly sulcate, the lateral margins like those of the fastigium but slightly broader. Eye as long as infra-ocular sulcus. Pronotum as in *pinguis*, expanding moderately caudad, this stronger between first and second transverse sulci, with distinct lateral carinae on prozona not as decided as in *compacta*, median carina slightly less well developed than in *pinguis*, weak but percurrent and cut only by the principal sulcus, continued on the three succeeding dorsal segments. Tegmina and wings absent, as in all species of *Bradynotes*. Interspace between mesosternal and metasternal lobes variable.<sup>39</sup> Furcula absent. Supra-anal plate trigonal-produced<sup>40</sup> with medio-longitudinal and lateral concavities decided proximad, the latter the more so. Cerci as long as supra-anal plate, tapering rather strongly in proximal half; distal half slender, more slender than in *pinguis*, tapering very slightly to the rounded apex, which is more sharply rounded ventrad than dorsad. Subgenital plate<sup>41</sup> as in *pinguis*; conical, lateral margins very feebly convex, then as feebly concave to apex, which is small, slightly produced and feebly notched. Cephalic and median femora slightly inflated, very feebly bowed.

*Allotype*.—♀; same data as type, but taken July 17, 1917. [Hebard Collection.]

Larger and more robust than male. Lateral carinae of fastigium distinct proximad between eyes, obsolete<sup>41</sup> above the foveolae; frontal costa broader

<sup>39</sup> In the two males at hand, the mesosternal interspace is as wide as the lobes themselves in one, distinctly wider in the other; the metasternal interspace is quadrate in one, distinctly broader in the other. These features are subject to individual variation in many species of the Melanopli and, in consequence, are of far less diagnostic value than has been supposed by Scudder and other authors.

<sup>40</sup> In the type this plate is narrow, with apex broadly rounded; in the paratype broader proximad, narrowing more strongly to the apex which is rather sharply rounded, forming an angle of slightly less than 90°. This much individual variability in the form of the male supra-anal plate is unusual. In the type of *pinguis*, the supra-anal plate is as long as its basal width, about intermediate in form between the present extremes, with concavities less decided.

<sup>41</sup> Varying to subobsolete in a few specimens of the series.

and more shallowly sulcate than in male. Eye slightly shorter than infraocular sulcus.<sup>42</sup> Pronotum much as in this sex of *pinguis*, but with very weak medio-longitudinal carina indicated throughout; pronotum considerably broadened caudad, with lateral carinae of prozona weakly defined. Succeeding segments to near apex of abdomen carinate medio-longitudinally. Ovipositor jaws much as in *pinguis*. Cephalic and median femora neither inflated or bowed.

*Measurements (in millimeters) of extremes*

	Length of body	Length of pronotum	Width of pronotal disk cephalad	Width of pronotal disk at principal sulcus	Length of caudal femur
♂					
Type . . . . .	18	3.8	2.2	3	10.1
Paratype . . . . .	16.2	3.3	2.1	3	9.7
♀					
Allotype . . . . .	23	4.6	3.2	4.7	11.8
Paratypes (8) . . . . .	18.7 <sup>43</sup> -25.8	4.8-4.7	3.1-3	4.6-4.4	11.6-12

*Coloration.*—General coloration of dorsal surface chestnut brown to mummy brown, becoming darker laterad on abdomen in males. Ventral surface antimony yellow in males, buffy in females, discolored in the majority of the present series. Head with occiput buffy, with a medio-longitudinal and two broader suffused bars of dark greenish brown, the lateral bars diverging caudad. Lateral carinae of fastigium individually jasper red to apricot orange proximad. Other portions of head ochraceous-buff with dark punctae, except for a suffused postocular bar of blackish brown. Pronotum with cephalic and caudal margins very narrowly jasper red, varying individually to apricot orange; smooth areas on lateral lobes beneath lateral carinae of disk buffy, as are the ventral portions of the lateral lobes in recessive examples. Cephalic and median limbs buffy. Caudal femora with pagina dark brown, irregularly buffy proximad; dorso-external and ventro-external surfaces ochraceous-buff; ventral portion of genicular lobes and narrow margin of dorsal surface scarlet to scarlet red; dorso-internal surface ochraceous-buff with two weak transverse bands of dark brown, these individually variable in intensity but more prominent in males than females; ventro-internal surface brazil red, deepening medio-longitudinally to claret brown or in some examples blackish. Caudal tibiae nopal red, the spines paler and black tipped; in three females the tibiae are deep bluish gray-green proximad, while in two the tibiae are deep delft blue, paler externally and shading to vandyke red in disto-internal half.

*Specimens Examined:* 12; 2 males, 9 females and 1 immature male.

UTAH: Cedar Mountains and Duck Lake, Cedar Mountains, Iron County.

The present series, besides the type and allotype, are designated paratypes. All were taken by G. P. Englehardt, from July 11 to 17, 1917, in the same general region, at elevations from 8500

<sup>42</sup> Varying to as long as infraocular portion of genae in some specimens.

<sup>43</sup> A shrivelled specimen.

to 9000 feet. The species was found not uncommon and rather sluggish, most frequently along open parts of a trail, among sparse growth of grasses on dry, sandy soil.

**Bradynotes deplanata** new species (Plate XXIX, fig. 13; plate XXX, fig. 2.)

This species is closely allied to *B. pinguis* Scudder (see plate XXX, fig. 1), differing in the smaller size, broader form, deplanate disk of pronotum with lateral carinae decided and, in the male sex, in the slightly more slender cerci.

The insect agrees with *B. compacta* Morse in the well-developed lateral carinae of the pronotum. The pronotum differs in having the disk deplanate and broader caudad, due to the fact that the lateral carinae are strongly divergent caudad between the first and second transverse sulci, thence rather strongly divergent caudad, not almost evenly and weakly divergent caudad as in *compacta*. In the male sex the cerci are not as slender as in *B. obesa* (Thomas) (see plate XXIX, fig. 10), *compacta* or *B. kaibab* here described, of the same type but more slender than in *pinguis*.

*Type*.—♂; Big Meadows of the Deschutes River, eighteen miles southwest of Bend, Crook County, Oregon. July, 1913. (C. H. Kennedy.) [Hebard Collection, Type no. 502.]

Size medium small for genus, slightly larger than in *kaibab*; form very heavy, heavier than in that species or in *pinguis*; surface moderately pilose. Head and eyes much as described for *kaibab*, except that the frontal costa is slightly less pinched at its juncture with the fastigium and is scantily punctate. Pronotum with disk strikingly deplanate, expanding rather strongly caudad, this greatest between the first and second transverse sulci, with lateral carinae well developed as in *compacta* and continued to near the caudal margin; medio-longitudinal carina as in *kaibab*, weak but percurrent and cut only by the principal sulcus, continued on the three succeeding dorsal segments. Tegmina and wings absent. Furcula absent. Supra-anal plate rather narrowly trigonal-produced, with apex broadly rounded, medio-longitudinal depression decided proximad, lateral concavities decided proximad. Cerci as long as supra-anal plate, of the same type as in *pinguis*, tapering to the slender apex, which is oblique truncate, the dorsal angle being obtuse-angulate but sharply rounded, the ventral angle acute-angulate but more broadly rounded, distal portion more slender than in *pinguis*, very slightly heavier than in *kaibab*. Subgenital plate conical, lateral margins almost straight to the very feebly elevated apex, which is small, slightly produced, entire. Cephalic and median femora slightly inflated, very feebly bowed.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Larger and more robust than male. Lateral carinae of fastigium percurrent, frontal costa as deeply sulcate as in male. Eye slightly shorter than infra-ocular sulcus. Pronotum considerably broadened caudad, with disk strikingly deplanate between the lateral carinae which are weaker than in male, but heavier than in females of *pinguis*, with a very weak medio-longitudinal carina indicated throughout. Succeeding segments to near apex of abdomen medio-longitudinally carinate. Ovipositor jaws apparently much as in *pinguis*.<sup>4</sup> Cephalic and median femora neither inflated or bowed.

*Measurements (in millimeters) of extremes only*

	Length of body	Length of pronotum	Width of pronotal disk cephalad	Width of pronotal disk at principal sulcus	Length of caudal femur
♂					
<i>Type</i> . . . . .	19	3.9	2.6	3.6	10.4
<i>Paratypes</i> (12) . . . . .	18-19.8	3.5-4	2.2-2.6	3-3.7	10-11.1
♀					
<i>Allotype</i> . . . . .	23	4.7	3.1	4.6	12
<i>Paratypes</i> (5) . . . . .	20.3-23	4.5-4.9	3.1-3	4.4-4.8	11.8-12

*Coloration*.—Male. Head light ochraceous-buff, occiput suffused triangularly with blackish, leaving the portions toward the eyes buff, lateral carinae of fastigium brazil red proximad, thence blackish with a claret tinge, as are the lateral carinae of the frontal costa; a vertical suffusion of this color from between antennal socket and eye to clypeal suture on each side and another oblique irregular suffusion across the genae, from an olivaceous postocular bar. Disk of pronotum snuff brown, the lateral carinae claret brown; lateral lobes of pronotum buffy ventrad, meso-proximad and in two smooth areas below lateral carinae of disk, remaining portions suffused with black. Mesonotum and metanotum suffused with black except for a medio-longitudinal line of buffy, and buffy in small areas dorso-laterad, from which tegmina and wings would spring if present. Abdomen suffused with black proximad, except for a medio-longitudinal line of buffy, the black areas continued half the distance to apex of abdomen on sides, and as a narrow weak suffusion dorso-laterad, to and including the supra-anal plate, remaining portions of abdomen buffy. Cephalic and median femora buffy, in type with dorsal surface washed with brick red and cephalic face heavily marked distad with black and brick red; in other individuals almost immaculate. Cephalic and median tibiae in type buffy, with cephalic face heavily lined longitudinally with black, this indicated only by a weak proximal suffusion in other examples. Caudal femora with pagina suffused with blackish, the reticulations buffy proximad and mesad; dorso-external and ventro-external surfaces ochraceous-buff, carinae tinged with reddish, ventral margin of genicular lobes and narrow dorso-distal margin garnet brown; dorso-internal surface ochraceous-buff with three heavy transverse blackish bands, the more proximal being basal in position; ventral surface

<sup>4</sup> In this specimen retracted, so that only the tips project beyond the supra-anal plate.

with margins brazil red, the remaining portion black with a claret tinge. Caudal tibiae with dorso-proximal lobe strikingly salmon-orange; external face buffy except proximad, where it is deep bluish gray-green and narrowly dorsad bluish gray-green; ventral face buffy; dorsal face nopal red, except briefly suffused proximad with vandyke red;<sup>45</sup> internal face similar but with intensity of coloration not as great. The allotypic female is similar but not as brilliant, while the dark areas are more extensive. The pronotal disk is mars brown, the dorsal surface of the abdomen mars brown, except for a narrow medio-longitudinal line and disto-laterad, where it is cinnamon brown.

*Specimens Examined:* 19; 13 males and 6 females.

OREGON: Big Meadows of the Deschutes River, eighteen miles southwest of Bend.

This series was collected, in July, 1913, by C. H. Kennedy, probably in the eastern edge of the dry pine woods, covering the eastern edge of the Cascade Mountains, and given to W. T. Davis. Due to Mr. Davis' generosity, the series is now divided between the Davis and Hebard Collections and those of the Academy of Natural Sciences of Philadelphia and United States National Museum. The specimens, other than the type and allotype, are designated paratypes.

**Melanoplus huporeus**<sup>46</sup> new species (Plate XXX, fig. 3; plate XXXI, fig. 2.)

The present species belongs to the *Marginatus* Group, and shows distinctly closer affinity to *M. marginatus* Scudder, than to *M. gracilipes* Scudder.

From the long-winged *marginatus* it differs in the slightly heavier form, blunter vertex and broad oval tegmina, which frequently have the immediate apex acute and sharply rounded, but are never produced distad, with apex acute, to the degree normal in the short-winged *marginatus* variety *pauper* Scudder. In addition, males are readily separated by the form of the cerci, which in *marginatus* (see plate XXXI, fig. 1) are shorter, with apex truncate and strikingly inflated. In coloration the two species are very similar.

<sup>45</sup> The extent of this purplish portion varies slightly in the series. In the type of *pinguis* the caudal tibiae are nopal red, slightly paler proximad on the external face; in the allotype similar, but with a blackish green annulus below the dorso-proximal lobe. In a very large series of that species from timber line on Mt. Shasta, California, however, the tibiae are all bicolored, dark purplish proximad and red distad. This indicates that the color of the caudal tibiae in *pinguis*, and probably in related species, can not be considered of specific diagnostic value, as supposed by Scudder and used in his key, Proc. U. S. Nat. Mus. xx, p. 81, (1897).

<sup>46</sup> From *ὑπὸ ὄρειος* = living at the foot of the mountains.

*Type*.—♂; Colfax, Placer County, California. Elevation, 2450 feet. August 28, 1910. (Rehn and Hebard.) [Hebard Collection, Type no. 503.]

Size small, form slender. Head much as in *marginatus*, but with area of fastigio-facial angle distinctly less produced, the angle itself more broadly rounded. Frontal costa shallowly concave. Eye large, about two and one-half times as long as infra-ocular sulcus. Pronotum elongate, disk of equal width, with a slender but well defined and pereurrent medio-longitudinal carina. lateral carinae very weakly defined, caudal margin nearly transverse, very broadly obtuse-angulate produced. Prosternal spine as in *marginatus*; small. bluntly elongate subconical. Tegmina slightly shorter than pronotum, broadly oval with immediate apex acute and sharply rounded.<sup>47</sup> Furcula represented by a pair of minute, slender teeth, each about twice as long as wide, with apex bluntly rounded. Supra-anal plate simple, moderately elongate trigonal, the lateral margins showing very feeble convexity, surface with a moderately broad, proximal, medio-longitudinal sulcation. Cerei elongate, weakly curving inward, about three and one-half times as long as proximal width, tapering evenly in proximal two-fifths, median fifth slender with margins almost parallel, distal two-fifths enlarged, but not swollen or truncate as in *marginatus*, enlargement due to broad convexity of dorsal margin, with blunt apex at ventral margin; the ventral margin is almost straight, very feebly concave throughout, the dorsal margin more strongly concave to distal portion, where it is convex. Subgenital plate as in *marginatus*; median section of slightly greater depth laterad than mesad, with a small but distinct tubercle mesad, at the free margin. Limbs as in *marginatus*.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Size larger, form heavier than in male. The heavier form and less produced fastigio-facial angle as strikingly in contrast with this sex of *marginatus* as between males of these species. Fastigium of vertex and frontal costa decidedly broader and less sulcate than in male. Eye about two and one-quarter times as long as infra-ocular sulcus. Pronotum with medio-longitudinal carina not as sharp as in male. Ovipositor and limbs as in *marginatus*.

*Measurements (in millimeters) of extremes only*

	Length of body	Length of pronotum	Caudal width of pronotal disk	Length of tegmen	Width of tegmen	Length of caudal femur
♂						
<i>Type</i> . . . . .	14.5	3.1	2	3	2	8.2
<i>Paratypes</i> (28)	14.8-16.8	3-3.9	2-2.1	3-3.9	1.9-2.2	7.9-9.8
♀						
<i>Allotype</i> . . . . .	21	4	3	4.2	2.8	11
<i>Paratypes</i> (19)	18-22	3.6-4.8	2.6-2.9	3.3-4.9	2.1-3	9-11.3

<sup>47</sup> In the majority of the series attinent, varying from subattinent to feebly overlapping.

*Coloration.*—The males range in general coloration from ochraceous-buff, with postocular band of buckthorn brown weakly indicated on prozonal portion of pronotal lateral lobes, and flecks of the same color on the sides of the abdomen proximad, to cinnamon brown with blackish postocular bar occupying the dorsal two-fifths of the prozonal portion of pronotal lateral lobes, and sides of abdomen heavily marked with blackish latero-proximad. In the darker examples the caudal femora have the dorso-internal surface showing weakly two dark flecks, while the face, ventral three-fifths of pronotal lateral lobes and ventral surface are ochraceous-buff, in striking contrast with the dorsal surface. In intensive examples the ventral face of the caudal femora is russet, shading to mars brown mesad; in recessive individuals ochraceous-buff tinged with ochraceous-orange. The caudal tibiae are buffy, tinged with glaucous.

Females are similarly colored, the intensive condition being less often encountered. In this sex also, buffy examples are often washed with greenish, this sometimes including the pronotal disk, but usually confined to the head, lateral portions of pronotum and body and exposed surface of the caudal femora.

*Specimens Examined:* 49; 29 males, 20 females.

CALIFORNIA: Colfax.

The series, in addition to the type and allotype, may be considered paratypes. These specimens were taken by Rehn and Hebard on August 27 and 28, 1910, at Colfax, California, at elevations from 2450 to 2800 feet. The series was found on hillsides, in open places overgrown with low plants and particularly where much poison oak occurred, intermingled with a low sweet-smelling bush. The hillsides were clothed generally with high manzanita and other bushes, with a scattering growth of pines and other trees. In the same environment *M. lepidus* Scudder was found, both species generally scarce, but *lepidus* common and the present species scarcer in one limited area only.

**Melanoplus hesperus** new species (Plate XXX, figs. 5 and 6; plate XXXI, fig. 3.)

The present species belongs to the Marginatus Group and to that section including the forms closely related to *M. gracilipes* Scudder.

Nearest relationship is with *gracilipes* (see plate XXX, fig. 4); males of the present insect differ in the slightly more elongate form, much more elongate furcula, more elongate supra-anal plate, more elongate cerci, with inbent distal portion twice as long

as wide, instead of subquadrate, and even weaker blunt tuberculation of subgenital plate. Much the most important differences are found in the furecula and cerci. In size, form and general appearance this species agrees fully with *M. ligneolus* Scudder, another very closely related species. The present insect is particularly distinguished from all the forms closely related to *gracilipes* by the much more elongate furecula.

Females of these species are most difficult to separate. This sex of *hesperus* is a little more slender and elongate than females of *gracilipes*, in every way similar to females of *ligneolus* except in the very slightly more pronounced lateral carinae of the pronotum.<sup>48</sup>

*Type*.—♂; San Luis Obispo, San Luis Obispo County, California. August 21, 1909. (M. Hebard.) [Hebard Collection, Type no. 504.]

Size small, but, with *ligneolus*, largest of the species closely related to *gracilipes*. Form slender, much as in *gracilipes* and in *M. huporeus* here described. Head much as in *gracilipes*, but with area of fastigio-facial angle slightly more produced, much as in *huporeus*, but with frontal costa appreciably wider, as in *gracilipes*, showing only very slight concavity toward median ocellus. Eye large, over two and one-half times as long as infra-ocular sulcus. Pronotum elongate, disk of almost equal width throughout, median carina well defined and percurrent, lateral carinae distinct though very weakly defined, not subobsolete as in *gracilipes* or fully as weak as in *ligneolus*, caudal margin of disk broadly obtuse-angulate produced, more produced than in *gracilipes*. Prosternal spine as in *gracilipes*; elongate, bluntly subconical. Tegmina shorter than pronotum, rather broadly oval, feebly overlapping, with apex bluntly rounded. Furecula represented by a pair of slender elongate processes, which diverge at an angle of sixty (to ninety in series) degrees, three and one-half times as long as greatest width, length contained in that of supra-anal plate slightly less than two and one-half times, width about the same in proximal two-thirds and there separated by an interval of nearly equal width, thence tapering to the acute apex. Supra-anal plate shield-shaped; surface with a deep medio-longitudinal sulcus, running through proximal two-thirds, the lateral carinae of this sulcus each with mere traces of a transverse carina externally, mesad on the plate; surface with lateral portions rather strongly concave in proximal two-thirds, beyond which two broad, longitudinal, parallel, short ridges run to the free margin just before the apex. Between the supra-anal plate and the cerci, a portion of a basal plate is extruded, this causing the lateral margins of the plate to be somewhat elevated. Cerci moderately elongate, weakly curving inward, about two and one-fourth times as long as

<sup>48</sup> This feature is probably of little diagnostic value, as the degree of difference noted is easily within the limits of individual variation.

basal width, tapering slightly to distal third, which is twice as long as wide, with apex rounded and external face concave, this portion similar but rounded quadrate in *gracilipes*. Subgenital plate with median section of equal depth laterad and mesad, feebly blunt conical at free margin, this weaker than in *gracilipes*, not sufficiently developed to be termed a tuberculation.<sup>49</sup> Limbs as in *gracilipes*.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Size larger, form heavier than in male. Fastigium of vertex distinctly broader and less deeply sulcate than in male. Eye slightly more than twice as long as infra-ocular sulcus. Pronotum with lateral carinae even weaker than in male, but slightly more pronounced than in this sex of *lignicolus*. Ovipositor and limbs as in *gracilipes*.

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Caudal width of pronotal disk	Length of tegmen	Width of tegmen	Length of caudal femur
Type . . . . .	17.2	3.8	2	3.7	2.2	9.7
Paratypes (3)	16.3-16.8	3.7-3.8	2-2.2	3.3-3.9	2.1-2.1	9.3-10
♀						
<i>Allotype</i> . . . . .	19.2	4.1	2.9	4	2.8	11.9

*Coloration*.—Head cinnamon, except occiput which is sayal brown and a broad and sharply defined postocular band of prout's brown. Eyes cinnamon brown. Dorsum of pronotum sayal brown, paling slightly toward lateral carinae, lateral lobes with a band of prout's brown occupying dorsal third of prozonal portion, corresponding portion of metazona suffused, sayal brown, lower portions of lateral lobes cinnamon. Tegmina sayal brown, darkening gradually to cinnamon brown latero-ventrad. Abdomen cinnamon-buff with large flecks of blackish laterad on the four proximal segments. Underparts ochraceous-buff. Cephalic and median femora sayal brown. Caudal femora with pagina sayal brown, dorsal surfaces cinnamon with two proximal slightly darker areas on inner portion, remaining portions suffused cinnamon-buff. Caudal tibiae clay color.

The small series shows little color variation. The males of greater recessive coloration have the head, lower portions of the pronotal lateral lobes and dorsal surface of the caudal femora cinnamon-buff, the other portions paler to a like degree.

*Specimens Examined*: 5; 4 males and 1 female.

CALIFORNIA: San Luis Obispo.

<sup>49</sup> A large series of this species will, however, be needed to determine the value of this character. In some species, the degree of tuberculation of the subgenital plate appears to be subject to but little variation. In the closely related *M. nanus* Seudder, however, great variation in this feature occurs.

Other than the type, the three males are designated paratypes. The series was collected in a field of the sun-dried yellow grass which is characteristic of the Coast Ranges of California. The species was apparently numerous, the few specimens being secured during a brief train stop.

**Melanoplus microtatus** new species (Plate XXX, figs. 7 and 8.)

1909. *Melanoplus sonomaensis* Rehn and Hebard (not of Caudell, 1906), Proc. Acad. Nat. Sci. Phila., 1909, p. 468. [ $\sigma$ ,  $\varphi$ ; Santa Cruz, California.]

This species belongs to the Marginatus Group and to that section including the forms very closely related to *M. gracilipes* Scudder.

Nearest relationship is with *M. nanus* Scudder, to which species close affinity is shown, though not to the degree found in *M. sonomaensis* Caudell. The insect differs from *nanus* in the average smaller size,<sup>50</sup> the slightly but distinctly more slender form and, in the male sex, in the distinctive form of the cerci and the contour of the supra-anal plate.

Females of these species are almost inseparable. In the present very large series of *microtatus*, it is noted, however, that all are slightly but appreciably more slender, and that the large majority are of smaller size. The tegmina also average more approximate, but show so wide a range of variation in this feature, as well as in size and in length in proportion to width, that this can not be used safely as a character for individual determinations.

*Type*.— $\sigma$ ; Del Monte, Monterey County, California. August 20, 1909. (M. Hebard.) [Hebard Collection, Type no. 505.]

Size very small, smallest of the genus; form slender, slightly but appreciably more slender than in *nanus*. Head much as in *nanus*; fastigio-facial angle slightly more produced than in *gracilipes*, as in *hesperus* here described, *nanus* and *sonomaensis*; frontal costa as in *nanus*, no wider than in *huporeus* here described, but showing only slight concavity toward median ocellus, as in all the species here referred to except *huporeus*. Eye slightly over twice as long as infra-ocular sulcus. Pronotum elongate, disk of almost equal width throughout, median carina well defined and percurrent, lateral carinae distinct though weakly defined, much as in *hesperus*, caudal margin of disk broadly obtuse-angulate produced, as in *hesperus*. Prosternal spine as in *hesperus*. Tegmina considerably shorter than pronotum, almost attinent,<sup>51</sup> with apex rather

<sup>50</sup> This is the smallest species of the genus *Melanoplus* known. The smallest known examples of *M. puer* (Scudder) show a lesser length, but have a considerably greater body bulk.

<sup>51</sup> Varying to slightly overlapping in the series of males.

broadly rounded. Furcula as in *nanus*; represented by a pair of minute, slender, tapering processes,<sup>52</sup> length contained in that of supra-anal plate over three and one-half times. Supra-anal plate moderately elongate, shield-shaped, median sulcus decided to slightly beyond median point, the lateral carinae of this sulcus at median point on plate connected with lateral margins by transverse carinae, lateral margins to intersection with these carinae raised and somewhat thickened, lateral concavities deep before and beyond the transverse carinae, laterad toward apex two low, short, parallel ridges are developed, which terminate in the lateral margins of the plate.<sup>53</sup> As in *nanus*, between the supra-anal plate and the cerci, portion of a basal plate is extruded, this causing the elevation of the lateral margins of the supra-anal plate. Cerci decidedly shorter than in *hesperus*, somewhat shorter than in *nanus*, curving weakly inward with a trace of angulation at end of proximal two-thirds, slightly over twice as long as basal width, tapering strongly in proximal third, thence tapering weakly to the rounded apex, the shaft with a weak curvature dorsad, external surface of distal third deplanate, this portion about one and one-half times as long as its basal width. Subgenital plate with median section of equal depth laterad and mesad, tapering meso-distad to a well developed apical tubercle at the free margin.<sup>54</sup> Limbs as in *nanus*, caudal femora very slightly more slender than in *gracilipes* or *hesperus*.

*Allotype*: ♀; same data as type. [Hebard Collection.]

Size larger, form heavier than in male. Fastigium of vertex distinctly broader and less deeply sulcate than in male. Eye very slightly more than twice as long as infra-ocular sulcus. Pronotum with lateral carinae even weaker than in male. Tegmina separated by a very brief interval.<sup>55</sup> Size smaller than in *gracilipes*, form more slender, and caudal femora proportionately smaller.

<sup>52</sup> Varying individually from parallel to rather strongly divergent.

<sup>53</sup> This is an intensification of the type found in *nanus*. Frequent slight individual variation is shown and in a few specimens, showing least decided contour of the supra-anal plate, little difference from *nanus* in this feature is found.

<sup>54</sup> Among the paratypes of *nanus*, as well as in a larger series of that species before us, the subgenital plate, though normally with a well developed apical tubercle, varies through a condition in which this tubercle is weak, to one in which the margin of the subgenital plate is rounded with no trace of a tubercle. As these species are very closely related, we might expect to find males of *microtatus* occasionally lacking an apical tubercle, but such is not the case in the very large series at hand, though some slight difference in degree is occasionally shown.

<sup>55</sup> In females of the present series averaging about .4 mm.; in the series of females of *nanus* averaging about .9 mm.

*Measurements (in millimeters) of extremes only*

♂	Length of body	Length of pronotum	Caudal width of pronotal disk	Length of tegmen	Width of tegmen	Length of caudal femur
Del Monte, California, <i>type</i> ..	11.8	2.9	1.6	2	1.7	7.3
Del Monte, California, <i>paratypes</i> (170)	11.7-14.7	2.7-3.2	1.5-1.8	1.8-2.7	1.3-1.8	7-8.8
♀						
Del Monte, California, <i>allotype</i> .....	17	3.1	2	2.3	1.8	8.8
Del Monte, California, <i>paratypes</i> (152) ..	13-18.2	2.9-3.9	1.8-2.5	2.2-3.7	1.8-2.3	8.1-10.7
Monterey, California .....	17	3.9	2.5	3.2	2.2	10

*Coloration*.—As described for *hesperus* on page 284, except that the type and a large proportion of the series are more intensive in coloration. In these the occiput, disk of pronotum and tegmina are blackish chestnut brown, the postocular bar and dorsal third of the prozonal portion of the pronotal lateral lobes shining black. The lateral dark markings of the abdomen are expanded and deepened into a suffused blackish band, which narrows distad, but is continued on the subgenital plate as a dark suffusion. The femora have the pagina very dark prout's brown, with an oblique line of light buff dorso-mesad and are bordered ventrad with warm buff, this widest proximad; the dark areas on the internal portion of the dorsal surface are prout's brown, while the internal face is suffused with prout's brown meso-distad and dorso-mesad. This intensive type of coloration is found in females, but not as frequently as in males.

Every gradation is shown by the series of females to a maximum recessive condition, in which the general coloration is clay color, the postocular band subobsolete on head and lateral lobes of pronotum, the dark lateral abdominal band indicated by three small suffusions of prout's brown on the proximal abdominal segments.

*Specimens Examined*: 327; 172 males and 155 females.

CALIFORNIA: Santa Cruz, Monterey and Del Monte.

The entire series, with the exception of three specimens, was taken at Del Monte on August 20, 1909, by Hebard and on September 9 and 10, 1910, by Rehn and Hebard. Excluding the type and allotype, these are designated as paratypes. The species was found in great numbers in extensive open areas of short, dry grass, where a low yellow-flowered "tar-weed" was

plentiful. It was, however, almost ubiquitous and in the heavy chaparral, where Orthoptera was not abundant, some of the darkest examples were secured.

One female was taken at Monterey on July 4, 1916, by G. P. Englehardt, while a pair was secured by Hebard at Santa Cruz, Santa Cruz County, on August 28, 1907. The male of this pair is somewhat atypical in having the cerci straighter and more slender distad than in any of the typical series.

**Melanoplus aspasmus**<sup>56</sup> new species (Plate XXX, figs. 9 and 10; plate XXXI, fig. 4.)

This is a striking species of the Marginatus Group. It shows no close relationship to any of the other species. The fastigio-facial angle is as blunt as in *M. gracilipes* Scudder, the furcula resemble more closely those found in *M. hesperus* here described and the cerci to some degree suggest those of *M. microtatus* here described.

The insect is the most robust of the group and is distinctive in the form of the male genitalia, particularly that of the subgenital plate, which is rounded with free margin flaring outward evenly throughout.

*Type*.—♂; Paso Robles, San Luis Obispo County, California. August 21, 1909. (M. Hebard.) [Hebard Collection, Type no. 506.]

Size small, slightly smaller than in *gracilipes*. Form moderately stout, distinctly the heaviest species of the Marginatus Group, many of the species of which are very slender. Surface moderately well supplied with long pile, this most noticeable on caudal limbs and subgenital plate. Head of the same type as in *gracilipes*, but not as deep, the fastigio-facial angle even blunter, the face distinctly less strongly retreating; the frontal costa wide, as wide as in *gracilipes*, showing only slight concavity toward the median ocellus.<sup>57</sup> Eye large, distinctly broader than in *gracilipes* or the species closely related, about two and one-quarter times as long as infra-ocular sulcus. Pronotum moderately elongate, proportionately distinctly shorter than in *gracilipes* or the related species; lateral carinae subobsolete, as in *gracilipes*; caudal margin of disk obtuse-angulate produced, with angulation rather sharp, production greater than in *gracilipes* or any other species of the Marginatus Group, but of the same type found in *M. marginatus* Scudder. Prosternal spine bluntly conical, distinctly shorter than in *gracilipes*. Tegmina attingent, broad oval with

<sup>56</sup> From ἀσπασμός = striking.

<sup>57</sup> In one paratypic male the lateral margins of the frontal costa are moderately carinate, the surface of the frontal costa resultantly shallowly concave, much as is normal in *M. huporeus* here described.

apex rather broadly rounded,<sup>58</sup> distinctly shorter than pronotum, attinent. Furcula represented by a pair of elongate processes, which diverge at an angle of about ninety degrees, tapering from their heavy and attinent bases to their slender and sharply rounded apices, nearly three times as long as basal width, length contained in that of supra-anal plate less than two and one-half times. Supra-anal plate trigonal shield-shaped, medio-longitudinal sulcus percurrent, but strongly defined only in proximal three-fifths, lateral portion deeply concave, the lateral margins strongly raised and thickened proximad, with a flexure at end of proximal third, thence gradually diminishing in height and weakly concave opposite apices of cerci at beginning of apical third; the apical portion beyond deplanate with a small node latero-proximad on each side. Between the supra-anal plate and the cerci a portion of a basal plate is conspicuously extruded, this causing the elevation of the lateral margins of the plate. Cerci suggesting those of *M. microtatus* here described, but distinctly more complex; about twice as long as proximal width, broad proximad, tapering strongly in proximal half, this due to the strong concavity of the dorsal margin, distal half relatively slender, of nearly subequal width, dorsal and ventral margins feebly convex to rounded apex, length about twice median (greatest) width, external surface longitudinally concave below median line. Subgenital plate with dorso-lateral angles at free margin rectangulate and rather sharply rounded, more sharply rounded and prominent than in any other species of the Marginatus Group; free margin of almost equal thickness and convexity throughout, somewhat more thickened mesad but showing no trace of tuberculation; median section of plate of almost equal depth laterad and mesad; surface flaring outward to free margin evenly throughout, this type distinctive and wholly unlike that developed in any other species of the Marginatus Group. Limbs much as in *gracilipes*, except that the caudal femora are distinctly shorter and heavier.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Size larger, form heavier than in male,<sup>59</sup> resultantly heavier than in any females of the Marginatus Group. Fastigium of vertex distinctly broader and less deeply sulcate than in male. Eye proportionately much as in male. Pronotum with lateral carinae subobsolete, obtuse angulation of caudal margin somewhat broader but similarly rather sharp. Tegmina attinent (to separated by a brief interval in the series), (normally) rather broadly rounded distad. Limbs with caudal femora as distinctly shorter than in the related species as in male.

*Coloration*.—Male (intensive). General coloration clay color tinged with cinnamon. Eyes russet. A postocular bar, continued on the prozonal portion of the lateral lobes and broadening caudad, is shining blackish mummy brown. Tegmina tinged with cinnamon brown, particularly laterad. Proximal segments of abdomen marked dorso-laterad with moderately large maculae

<sup>58</sup> Normally thus in males, apex occasionally rather sharply rounded; apex averaging more broadly rounded in females.

<sup>59</sup> It is to be remembered that males of *aspmus* are as heavy as females of *microtatus*.

of shining blackish mummy brown. Caudal femora with internal portion of dorsal surface showing two patches of dark brown, these continued on the internal face, and pagina tinged with dark brown dorsad in corresponding position. Caudal tibiae buffy, faintly tinged with glaucous.

The series shows variation to a recessive type (one male) in which the entire insect is ochraceous-buff, the postocular bar on head and pronotum obsolete, the markings of the caudal femora subobsolete, the caudal tibiae buffy. This recessive condition is in preponderance among females of the present series, fourteen being quite as immaculate, while but two of the remainder are strongly intensive.

This color pattern and similar intensification and recession is likewise found in other species of the *Marginatus* Group, but in none have we found as large a proportion of strongly recessive examples.

*Measurements (in millimeters) of extremes only*

	Length of body	Length of pronotum	Caudal width of pronotal disk	Length of tegmen	Width of tegmen	Length of caudal femur
♂						
Type . . . . .	15.3	3.8	2	2.9	2.1	8.7
Paratypes (7) . . . . .	14-15.8	3.2-3.7	2-2.1	2.6-3.7	2-2.3	8-8.8
♀						
Allotype . . . . .	16.2	3.8	2.5	3.2	2.4	8.9
Paratypes (19) . . . . .	15.2-18	3.7-4	2.7-2.9	2.9-3.7	2.2-2.6	8.5-9.9

*Specimens Examined:* 28; 8 males and 20 females.

CALIFORNIA: Paso Robles.

The entire series, which in addition to the type and allotype may be considered paratypic, was taken at Paso Robles, California, on August 21, 1909, by the author. The species was found at elevations of from 750 to 900 feet in the low, dry, sun-cured, yellow grass, on hillsides dotted with oaks. Though not common, this was the most abundant species of Orthoptera encountered at this locality.

**Melanoplus acidocercus** <sup>60</sup>new species (Plate XXXI, fig. 6.)

The present insect is a member of the Scudder Group, showing nearest affinity to *M. carnegiei* Morse (see plate XXXI, fig. 5). Compared with that species it is found to be of average larger size, showing certain differences of color pattern, while the tegmina average broader. Males are, in addition, readily distinguished by the form of the cercus: in *acidocercus* the cercus is decidedly more elongate, averaging one and one-half times as long as basal width, tapering to the acute and slender apex; in *carnegiei* the cercus is short, averaging about as long as its basal

<sup>60</sup> From *akts* = pointed (acute), and cercus.

width, triangular, with apex acute, but not at all slenderly produced.<sup>61</sup>

In general appearance the present insect is about intermediate between *M. scudderi* (Uhler) and *Eotettix quercicola* Hebard. It is evident that this species represents the type in the genus *Melanoplus* showing nearest approach to that section of the genus *Eotettix* which includes *quercicola* and *davisi* Hebard. The two latter species have a distinctive facies: in being more polished with coloration more brilliant, particularly in life, in showing distinctive features in color pattern and in having larger heads with antennae much more elongate.

The resemblance of the present species lies largely in the general, though not detailed, similarity of coloration, coupled with a very slightly greater smoothness than found in the allied species of *Melanoplus*.

*Type*.—♂; Bainbridge, Decatur County, Georgia. September 5 and 6, 1915. (Rehn and Hebard.) [Hebard Collection, Type no. 508.]

Size slightly larger, form slightly more elongate than in *scudderi*, much as in lowland series (Yemassee, South Carolina) of *carnegiei*. Fastigium of vertex and frontal costa similar, but slightly more sulcate; sulcus weak but distinct throughout, well defined between the lateral ocelli. Antennae normal, about one and three-quarters times as long as pronotum, as in *carnegiei*. Eye slightly longer than cheek, about one and three-quarters times as long as infra-ocular sulcus. Pronotum much as in *scudderi*; the precurrent median carina, cut only by principal sulcus, very slightly heavier, about as well developed as in *Eotettix davisi* and *quercicola*; caudal margin of pronotum obtuse-angulate produced (at about 120°) with angulation broadly rounded, more produced than in *Eotettix davisi* or *quercicola*. Tegmina broad oval, overlapping.<sup>62</sup> Distal portion of abdomen scarcely enlarged. Furcula as in *carnegiei*, represented by two minute projections, the areas from which they spring enlarged and separated by a subrectangulate emargination. Supra-anal plate as in *carnegiei*; shield-shaped, with a decided medio-longitudinal sulcus in proximal half, lateral portions broadly concave, distal portion nearly deplanate. Cercus slightly over one and one-half times as long as basal width, margins rather

<sup>61</sup> Some slight individual variation is shown by the series of that species at hand. One male, of two from Atlanta, Georgia, has the cercus approaching the condition found in *acidocercus* much more closely than in any other specimens. In this individual the cercus is nearly one and one-half times as long as its basal width, but much broader distad than in any specimen of *acidocercus* at hand. The other Atlanta male of *carnegiei* has perfectly typical cerci.

<sup>62</sup> Varying to attingent in a very few males of the series.

decidedly convergent in proximal half, thence less strongly convergent to the acute apex, dorsal margin broadly concave, ventral margin nearly straight. Subgenital plate as in *carnegiei*; short, tapering to the bluntly rounded apex. Limbs as in *carnegiei*.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Size decidedly larger, form decidedly more robust than in male. Resembling females of *Eotettix quereicola* except that it is smaller, with head proportionately distinctly smaller, antennae shorter, disk of pronotum showing no gloss, caudal margin of pronotum less produced and caudal tibiae less heavy. Fastigium of vertex and frontal costa wider than in male, briefly deplanate in area between lateral ocelli and antennal sockets. Eye slightly longer than cheek, about one and one-half times as long as infra-ocular sulcus. Tegmina well overlapping.<sup>63</sup> Ovipositor valves moderately elongate, moderately curved distad to their acute apices, much as in *Eotettix quereicola*, appreciably more curved than in *carnegiei*. Interspace between mesosternal lobes scarcely longer than broad. Limbs as in male but heavier, much as in females of *Eotettix quereicola*, but with caudal tibiae distinctly less strongly pilose.

*Measurements (in millimeters) of extremes only*

	Length of body	Length of pronotum	Caudal width of pronotal disk	Length of tegmen	Width of tegmen	Length of caudal femur
♂						
<i>Type</i> . . . . .	18.7	5	3	3.7	2.9	11.1
<i>Paratypes</i> (40)	18.5-20	4.8-5.2	2.9-3.1	3.2-4.6	2.8-3.2	10.4-11.6
♀						
<i>Allotype</i> . . . . .	25	6.4	4.2	5.5	4	14.1
<i>Paratypes</i> (36)	22.2-25.7	5.8-6.7	3.8-4.4	4-6	3.9-4.1	12.8-14.4

*Coloration*.—Male. Almost identical with material of *carnegiei* from the lowland pine woods (Yemassee, South Carolina); more tawny and less grayish than highland material of that species. Face, underparts, cephalic and median limbs and lower portion of pronotal lateral lobes clay color. Antennae russet, becoming darker distad. Eyes deep chestnut. Occiput, pronotal disk and tegmina mars brown. A moderately broad, shining, black postocular band expands caudad on the prozonal portion of the pronotal lateral lobes, filling more than half that surface and continued on the metazonal portion, but there not shining. Metapleura without a pale bar. Abdomen sayal brown weakly suffused with mars brown proximad. Caudal femora sayal brown, the genicular areas and two weak transverse suffusions of the dorsal surfaces blackish. Caudal tibiae coral red, well supplied with whitish pile, spines entirely black.

In recessive males the occiput and disk of pronotum are often as pale as the caudal femora, while the transverse bands of the dorsal surfaces of the caudal femora become obsolete.

Female. Generally cinnamon; lateral lobes of pronotum and caudal femora slightly darker, mikado brown. Postocular bar subobsolete. Tegmina with veins cinnamon and interspaces verona brown. Caudal femora slightly paler

<sup>63</sup> To (rarely) subattinent in females before us.

than general coloration, pinkish cinnamon, with genicular areas warm sepia and dorsal surfaces showing two broad transverse bands of mikado brown. Caudal tibiae as in male.

In females of maximum recessive coloration the entire insect is pinkish cinnamon, the postocular bar obsolete, the tegmina and dorsal surfaces of the caudal femora practically immaculate.

*Specimens Examined*: 84; 41 males, 37 females and 6 immature females.

GEORGIA: Bainbridge.

The entire series of adults, in addition to the type and allotype, may be considered paratypes. The series was taken by Rehn and Hebard on September 5 and 6, 1915. The species was found common in oak shoots in areas of sandy soil overgrown with oaks, and occasional among the scant grasses and plants growing on sandy soil, in the higher areas of the long-leaf pine woods near Bainbridge. Its habits much resembled those of *scudderi*.

Although this species was the sole member of the group found generally distributed in the oak and long-leaf pine woods at Bainbridge, it was absent from the undergrowth of the long-leaf pine woods growing in the narrow strip of flood-plain bordering the Flint River. In this latter locality, among scant plants, grasses and vines, *scudderi*, instead, was found.

**Melanoplus pegasus** new species (Plate XXXI, fig. 8.)

1916. *Melanoplus furcatus* Rehn and Hebard (not *Melanoplus furcatus* Scudder, 1897), Proc. Acad. Nat. Sci. Phila., 1916, p. 244. [Billy's Island, Jordan's on Billy's Island and Honey Island, all in Okefenokee Swamp, Georgia.]

The present insect is closely related to *M. furcatus* Scudder (see plate XXXI, fig. 7), and belongs to the Clypeatus Group. From *furcatus* it differs in the more solid coloration, in this respect closely resembling *M. clypeatus* (Scudder), and in the form of the male cerci, which show a further specialization of the type found in *furcatus*, the branches of the forked distal portion being more elongate and slender, and the ventral branch exceeding the dorsal branch in length.

With the unique male, type of *furcatus*, and a single male of the present species before them, Rehn and Hebard were, in 1916, unable to ascertain whether the differences found were specific

or due merely to individual variation. The series now at hand is constant in these differences, sufficient in our opinion for full specific separation.

*Type*.—♂; Billy's Island, Okefenokee Swamp, Charlton County, Georgia. July 16 to 19, 1917. (M. Hebard.) [Hebard Collection, Type no. 515.]

Size large, form robust but graceful. Fastigium of vertex feebly sulcate, frontal costa subsulcate except at median ocellus; as in *furcatus*. Antennae elongate, nearly twice as long as pronotum. Eye large, longer than cheek, twice as long as infra-ocular sulcus. Pronotum as in *furcatus*; medio-longitudinal carina distinct but not well developed on prozona, well developed on metazona, cut by sulci; lateral margins of disk distinct, rounding into the almost vertical lateral lobes; caudal margin of disk obtuse-angulate produced with angle rounded but rather sharp. Tegmina and wings almost reaching apex of abdomen.<sup>64</sup> Distal portion of abdomen enlarged. Furcula indicated as weak convexities on the segment from which these appendages spring when present,<sup>65</sup> the segment between these broadly angulate emarginate. Supra-anal plate as in *clypeatus*; very broadly shield-shaped and minutely triangularly produced meso-distad; medio-longitudinal carina deep and narrow in proximal two-thirds, thence weak, laterad of which sulcus the plate is broadly concave. Cercus moderately heavy, narrowing rather strongly to mesal portion, thence widening as strongly, strongly furcate; dorsal portion of furcation nearly twice as long as broad, with surface weakly concave, lateral margins feebly convex, subparallel and apex truncate with angles rounded; ventral portion of furcation distinctly longer than dorsal portion, broader at base, tapering evenly to the bluntly rounded apex, the dorsal portion of this margin, particularly distad, (frequently) sublamellate. Subgenital plate as in *furcatus*; moderately shallow, free margin briefly ascendant beyond cercal apices to the apex, which is slightly elevated in consequence, truncate, over twice as broad as high. Limbs as in *furcatus*.

*Allotype*.—♀; same data as type. [Hebard Collection.]

Size larger, form more robust than male, averaging not quite as heavy as in females of *furcatus*. Fastigium of vertex broader and scarcely concave. Tegmina and wings reaching base of supra-anal plate.<sup>66</sup> Ovipositor valves much as in *furcatus*; dorsal valves moderately recurved, ventral valves very weakly decurved. Limbs proportionately as in males.

<sup>64</sup> In paratypic males from reaching to slightly beyond base of supra-anal plate, to reaching slightly beyond apex of abdomen.

<sup>65</sup> In paratypic males varying from practically obsolete (frequent) to having minute angulations caudad of the margin of the segment (one specimen).

<sup>66</sup> In paratypic females showing very little variation. Two with abdomen pressed out have the abdomen extending considerably beyond the tegminal apices for this reason solely.

*Measurements (in millimeters) of extremes only*

	Length of body	Length of pronotum	Caudal width of pronotal disk	Length of wing	Length of caudal femur
♂					
Type . . . . .	31.8	7.6	4.6	19.7	17.8
Paratypes (23) . . . . .	29.9-34.9	7.2-8	4.1-4.7	19.4-22.7	17.9-18.9
♀					
Allotype . . . . .	37	8.7	5.3	21.3	21
Paratypes (12) . . . . .	33.4-37.7	8.2-9.2	5-5.4	19.3-22.2	20-21.3

*Coloration.*—Head and pronotum chestnut brown, a narrow post-ocular bar of dark chestnut brown continued feebly along the dorsal margin of the prozonal portion of the pronotal lateral lobes. Antennae hazel, darker distad. Eyes blackish brown. Dorsal field of tegmina buffy, heavily suffused with chestnut brown, particularly proximad; lateral fields dark chestnut brown. Underparts and abdomen cinnamon brown, the latter slightly paler. Metapleura cinnamon brown, with an oblique bar of buffy. Cephalic and median femora hessian brown, a purplish-red tinge distinct. Caudal femora with pagina cinnamon brown, suffused with blackish brown at apex, ventral margin strikingly straw yellow, this bar slightly broader proximad than distad, there slightly invading the pagina itself. Ventral surface of caudal femora brick red, becoming dragon's-blood red in sulcate portion, margined externally at margin of straw yellow bar with a few black dots, which fuse into a black line proximad and distad, distad occurs a broad pregenicular annulus of light buff. Caudal femora with dorso-external surface immaculate cinnamon brown with a russet tinge; dorso-internal surface tawny, with three moderately well defined suffusions of blackish chestnut brown, one of which is proximad, the most distal the broadest. Internal surface of caudal femora proximad suffused with dragon's-blood red, shading into carnelian red dorsad, the second dorsal suffusion broader and darker in dorsal half only, the third blackish and much broader and crossing the entire internal surface, pregenicular annulus warm buff and nearly as broad, genicular area externally and internally blackish except for the lobes which are buffy. Caudal femora dragon's-blood red, except for a very narrow blackish suffusion proximad and the spines, which are wholly black.

The series of males varies in general coloration from prout's brown dorsad and tawny olive laterad, to a maximum intensive condition in which the head and pronotum are blackish chestnut brown, with a comparatively broad blackish postocular bar, while the lateral fields of the tegmina are darker than the pronotum.

The females are very similar in coloration. They are a trifle less brilliant and the markings are more suffused, while the dorsal field of the tegmina averages paler, weak ochraceous-tawny, usually with a few scattered and inconspicuous flecks of darker brown.

In the series of adults, the pale ventro-external bar of the caudal femora is a conspicuous feature, much more sharply defined than in *furcatus*, while in that

species the femoral dark areas are less solid and the median dark area extends on the pagina. The coloring of the lateral fields of the tegmina is also less solid in *fuscatus*, in some specimens heavily flecked with darker brown.

*Specimens Examined:* 55; 24 males, 13 females, 3 immature males and 15 immature females.

GEORGIA: Billy's Island, Jordan's on Billy's Island and Honey Island, all in Okefenokee Swamp.

In addition to the type and allotype, the adults are designated paratypes. The entire series, excepting those previously recorded, was taken by the author, on Billy's Island, from July 16 to 19, 1917.

This species was found in moderate numbers, the series being taken only after long and careful search through the proper areas. It was found in thick, rich, bushy undergrowth surrounding wet depressions filled with swamp-loving trees, these areas scattered through the long-leaf pine woods. Only in these thick margining zones of rich vegetation, growing about waist high, were specimens found. The males frequently flew short distances in a direct, plunging manner, the females were less likely to fly and were more difficult to locate.

In such environment we have found that all the species related to *clypeatus* occur. Thus all are extremely local in distribution and are easily overlooked. This probably accounts for the difficulty we had long experienced in securing series of any of these species. The present species probably reaches the maximum in number of adults about the beginning of August. The latest date we have for adults is September 1 to 5.

## EXPLANATION OF PLATES

## Plate XXIX

- Fig. 1.—*Hesperotettix pacificus capillatus* new race. Lateral outline of male (*type*). ( $\times 2\frac{1}{2}$ )
- Fig. 2.—*Acoloplus cremiaphila* new species. Lateral outline of male (*type*). ( $\times 2\frac{1}{2}$ )
- Fig. 3.—*Acoloplus cremiaphila* new species. Lateral outline of tegmen of female, showing maximum tegminal development in series. Pilot Mountains, Nevada. ( $\times 2\frac{1}{2}$ )
- Fig. 4.—*Oedaleonotus fraterculus* new species. Lateral outline of male (*type*). ( $\times 2\frac{1}{2}$ )
- Fig. 5.—*Oedaleonotus phryneicus* new species. Dorsal outline of pronotum of female (*allotype*). ( $\times 2\frac{1}{2}$ )
- Fig. 6.—*Oedaleonotus phryneicus* new species. Lateral view of female (*allotype*). ( $\times 2\frac{1}{2}$ )
- Fig. 7.—*Oedaleonotus tenuipennis* (Scudder). Dorsal outline of pronotum of female. San Gabriel Mountains, California. ( $\times 2\frac{1}{2}$ )
- Fig. 8.—*Asemoplus somesi* new species. Furcula and supra-anal plate of male (*type*). (Greatly enlarged.)
- Fig. 9.—*Asemoplus somesi* new species. Outline of cercus of male (*type*). (Greatly enlarged.)
- Fig. 10.—*Bradynotes obesa* (Thomas). Outline of cercus of male. Helena, Montana. (Greatly enlarged.)
- Fig. 11.—*Bradynotes pinguis* Scudder. Outline of cercus of male (*type*). (Same scale as fig. 10.)
- Fig. 12.—*Bradynotes kaibab* new species. Outline of cercus of male (*type*). (Same scale as fig. 10.)
- Fig. 13.—*Bradynotes deplanata* new species. Outline of cercus of male (*type*). (Same scale as fig. 10.)
- Fig. 14.—*Bradynotes compacta* Morse. Outline of cercus of male (*paratype*). (Same scale as fig. 10.)

## Plate XXX

- Fig. 1.—*Bradynotes pinguis* Scudder. Dorsal view of pronotum of male (*type*). ( $\times 4\frac{1}{2}$ )
- Fig. 2.—*Bradynotes deplanata* new species. Dorsal view of pronotum of male (*type*). ( $\times 4\frac{1}{2}$ )
- Fig. 3.—*Melanoplus luporeus* new species. Furcula and supra-anal plate of male (*type*). (Greatly enlarged.)
- Fig. 4.—*Melanoplus gracilipes* Scudder. Cercus of male (*type*). (Greatly enlarged.)
- Fig. 5.—*Melanoplus hesperus* new species. Furcula and supra-anal plate of male (*type*). (Greatly enlarged.)

- Fig. 6.—*Melanoplus hesperus* new species. Cercus of male (*type*). (Same scale as fig. 4.)
- Fig. 7.—*Melanoplus microtatus* new species. Furecula and supra-anal plate of male (*type*). (Same scale as fig. 5.)
- Fig. 8.—*Melanoplus microtatus* new species. Cercus of male (*type*). (Same scale as fig. 4.)
- Fig. 9.—*Melanoplus aspasmus* new species. Furecula and supra-anal plate of male (*type*). (Same scale as fig. 5.)
- Fig. 10.—*Melanoplus aspasmus* new species. Cercus of male (*type*). (Same scale as fig. 4.)

## Plate XXXI

- Fig. 1.—*Melanoplus marginatus* Scudder. Cercus of male. Ahwahnee, California. (Greatly enlarged.)
- Fig. 2.—*Melanoplus huporeus* new species. Cercus of male (*type*). (Same scale as fig. 1.)
- Fig. 3.—*Melanoplus hesperus* new species. Caudal view of subgenital plate of male (*type*). (Greatly enlarged.)
- Fig. 4.—*Melanoplus aspasmus* new species. Caudal view of subgenital plate of male (*type*). (Same scale as fig. 3.)
- Fig. 5.—*Melanoplus carnegiei* Morse. Outline of cercus of male. Asheville, North Carolina. (Greatly enlarged.)
- Fig. 6.—*Melanoplus acidocercus* new species. Outline of cercus of male (*type*). (Same scale as fig. 5.)
- Fig. 7.—*Melanoplus furcatus* Scudder. Cercus of male (*type*). (Greatly enlarged.)
- Fig. 8.—*Melanoplus pegasus* new species. Cercus of male (*type*). (Same scale as fig. 7.)